

Ratzlaff Ranch Restoration Site, Merced River
 Ratzlaff/Robinson Channel Restoration Project

I. Executive Summary

Applicant California Department of Fish and Game (DFG)
 Region 4
 1234 East Shaw Avenue
 Fresno, California 93710

Project Description and Primary Biological/Ecological Objectives

The Ratzlaff Ranch Site is approximately a 1.5 mile river restoration project located immediately downstream of the State Highway 59 Bridge on the Merced River, 6 miles southwest of the town of Snelling. The project would improve river and floodplain dynamics, reestablish salmonid nursery habitat, reduce mortality of juvenile salmon due to predation and enhance the riparian corridor. This project is linked to the Robinson Ranch Restoration site. When combined, the Ratzlaff/Robinson Channel Restoration project can restore over 3 miles of important aquatic and riparian habitats. Specific project biological/ecological objectives are:

- Eliminate or reduce juvenile salmon predator habitat by filling or isolating the unnatural ponded areas in stream;
- Increase the quantity and quality of spawning habitat for chinook salmon by adding spawning gravel, reconfiguring spawning beds and the river course;
- Increase the quantity and quality of rearing habitat for chinook salmon by increasing available in-channel diversity;
- Improve river and floodplain dynamics by reconfiguring the channel to better conform with the present flow regime;
- Enhance riparian and seasonally inundated vegetation by increasing and revegetating floodplain at the project site which will be captured by the river during high flows.

Approach/Tasks/Schedules

Biologists, fluvial experts and engineers have developed preliminary plans for this area. The project has been divided into 3 specific construction units 1) the Ratzlaff reach, a major predator isolation project 2) the lower Western Stone reach, a river and floodplain restoration which would include chinook salmon spawning and rearing habitat improvements and 3) the Western Stone reach, similar to the lower Western Stone reach. Funding sources, specific construction designs and construction schedules would be developed for each reach. Environmental documentation for the total area would be completed. The Ratzlaff reach and the lower Western Stone reach could be constructed in 1998/99 if funding were obtained. Preliminary survey and construction plans for the Western Stone reach have been completed; final construction plans and funding are needed to construct the project in 2000.

Justification for Project and Funding by CALFED

The proposed project has been identified as a priority salmon restoration action in the following Central Valley salmon restoration planning documents: "Anadromous Fish Restoration Plan - Revised Draft Restoration Plan for the Anadromous Fish Restoration Program" (May 30, 1997); "California Department of Fish and Game "Restoring Central Valley Streams: A Plan for Action" (November 1993); "Joint CALFED/SJRMF San Joaquin River Fishery Technical Team Meeting Report (Preliminary Draft, February 13, 1997); "Comprehensive Needs Assessment for Chinook Salmon Habitat Improvement Projects in the San Joaquin River Basin" -- March 1994; San Joaquin River Management Plan (February 1995).

Budget Costs and Third Party Impacts

Partial funding for the project has been obtained. \$1,000,000 is being requested to supplement existing funding at this time. Additional funding would be requested in the future.

No adverse third party impacts are known at this time.

Applicants Qualifications

The DFG and DWR staff have worked closely with the various other state, federal and private personnel, to construct and repair chinook salmon spawning, rearing and predator pond isolation project in the San Joaquin River basin. The DFG and DWR have the clerical, fiscal and contractual personnel necessary to support the biological and technical experts administering this project.

Monitoring and Data Evaluation

Although no specific monitoring plan has been finalized, evaluation of the project would include the following.

- 1) Monitoring and evaluation of habitat types, physical properties of the river channel, substrate and floodplain would be completed to determine pre-project, as-built project and post-project specifications. Cross sectional transects, pebble counts, bulk sampling, scour chains and general survey methodology would be used to determine change over time.
- 2) Monitoring and evaluation of biological properties including salmon populations, predator populations (fish and bird), spawning and rearing habitat, and salmon smolt survival would be completed to determine biological changes over time. DFG biologists have, and will continue to monitor adult salmon escapements in the Merced River.
- 3) Revegetation success is required by permitting agencies and would be completed by photo documentation and transect evaluation.

Local Support/Coordination w/ other Projects/Compatibility with CALFED Objectives

Support for this project comes from the San Joaquin River Management Program participants, environmental groups, sport and commercial salmon fishers, and the numerous agencies involved in restoring riparian, wetland and aquatic habitats throughout the state.

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II. Title Page

Applicant California Department of Fish and Game (DFG)
Region 4
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Fresno, California 93710
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Type Organization Public Agency

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Type Project Construction

III. Project Description

Project Description and Approach

The Ratzlaff Ranch Site is approximately a 1.5 mile river restoration project located immediately downstream of the State Highway 59 Bridge on the Merced River, 6 miles southwest of Snelling. The proposed project is located on the Merced River between river miles 40.0 and 41.5 about 6 miles southwest of the town of Snelling. The project has been divided into 3 specific construction units 1) the Ratzlaff reach, a major predator isolation project 2) the lower Western Stone reach, a river and floodplain restoration which would include chinook salmon spawning and rearing habitat improvements and 3) the Western Stone reach, similar to the lower Western Stone reach (see Attachment 1). Each construction unit is discussed below.

The Ratzlaff construction reach is the most downstream reach of the Ratzlaff Ranch Restoration Site. In 1983, berms surrounding an abandoned, in-channel gravel pit failed. The river captured the pit, bypassing its original channel. The primary objective in this reach is to isolate the captured pond from the river and return the river to its original channel. This would be accomplished by building a berm to separate the river from the pond. This berm would be "set back" to increase channel capacity and decrease the possibility of berm failure during high flows. Isolating this pond would improve the survival of outmigrating chinook salmon smolts and improve sediment transport.

A secondary objective in this reach would be to improve salmon spawning and rearing habitat. The river's dimensions in the area would be sized to allow coarse sediment transport, river meander and point bar formation. Additional benefits include enhanced floodplain, improved river dynamics, and enhanced riparian corridor. Native riparian vegetation will be replanted on the newly constructed floodplain. Natural drainage from the surrounding area coupled with normal high river flow inundation would be conducive to maintaining a vegetation community of riparian and seasonal wetland species.

The Lower Western Stone construction reach is immediately upstream from the Ratzlaff reach. Several large ponds, remnants of past mining activities, are now part of the active channel. The reach is constricted causing erosion and instability during moderate to high flows. Recently, a berm on the river's north side has been breached allowing the river to capture another abandoned mining pit. The primary project objective in this construction reach is to remove predator habitat by filling and isolating several 5-10 foot deep ponds. In the constricted area, increasing floodplain width would allow the stream's energy to be dissipated, reducing erosion and restoring normal aggradational, degradational and meandering functions. Isolating in-channel pits will improve the survival of outmigrating smolts and improve sediment transport.

A secondary objective in this reach would be to improve salmon spawning and rearing habitat. The river's dimensions in the area would be sized to allow coarse sediment transport, river meander and point bar formation. All other benefits listed under the Ratzlaff construction reach would also apply here.

The Western Stone construction reach is immediately upstream from the Lower Western Stone reach and immediately below the State Highway 59 Bridge. It is the most upstream reach of the project. It is the transition between the Ratzlaff Ranch Restoration and the Robinson Ranch Restoration with the Highway 59 Bridge separating each. The river in this reach is generally

constricted but is braided in several places. Vegetation encroachment is prevalent in the area. Only cursory planning has been completed for this reach. Preliminary discussions have focused on widening the river corridor and increasing floodplain width to improve river dynamics. Spawning and rearing habitat improvements would also be included in this area.

The California Department of Transportation (CalTrans) is planning major repairs to the Highway 59 Bridge. DFG and DWR personnel have been in contact with CalTrans engineers and have discussed a cooperative restoration effort in this reach.

In summation, the Ratzlaff/Robinson Channel Restoration Project is divided into 2 main projects; 1) the Ratzlaff Site, downstream of the Highway 59 Bridge and 2) the Robinson Site, upstream of the Highway 59 Bridge. The Ratzlaff Site has been further divided into 3 construction reaches; 1) the Ratzlaff reach 2) the Lower Western Stone reach and 3) the Western Stone reach.

The major objectives of the project are to:

- Eliminate or reduce juvenile salmon predator habitat by filling or isolating the unnatural ponded areas in stream;
- Increase the quantity and quality of spawning habitat for chinook salmon by adding spawning gravel, reconfiguring spawning beds and the river course;
- Increase the quantity and quality of rearing habitat for chinook salmon by increasing available in-channel diversity;
- Improve river and floodplain dynamics by reconfiguring the channel to better conform with the present flow regime and increase sediment transport;
- Enhance riparian and seasonally inundated vegetation by increasing and revegetating floodplain at the project site which will be captured by the river during high flows.

Design channel specifics* are:

Low water channel dimensions	
width	65 - 85 feet
depth (pools)	3.0 - 6.0 feet
depth (riffles)	1.0 - 1.75 feet
Spawning channel dimensions (approximately 225 cfs)	
width	75 - 100 feet
depth (riffles)	1.0 - 2.0 feet
velocity (average)	1.5 - 2.5 feet/ second
Bankfull channel dimensions (3,000 cfs.)	
width	130 - 170 feet
depth	6.0 - 7.0 feet
velocity (average)	4.0 - 4.5 feet/ second
Floodplain channel dimensions (8,000 cfs)	
width	250 - 290 feet
maximum design flow	9,000 cfs.
slope	0.0014
Salmon habitat benefits	
predator habitat removed	53 acres
spawning area	12,000 yd ²

*All specifications are preliminary estimates and are subject to change with final design.

Geographical Location And Description

The project is located on the Merced River approximately 6 miles southwest of the town of Snelling. The State Highway 59 Bridge across the Merced River bisects the project. The surrounding area is rural, agricultural with several active gravel mining companies working in the area. Property immediately north of the project site is being mined by Western Stone Incorporated. Property immediately south and west of the project consists of orchards, vineyards and grazing lands. Property east of the project is farming and grazing lands interspaced with abandoned mined areas and remnant riparian cover.

The river itself has been mined in the past. Because of this mining activity, erosion and breached levees, the river flows through several deep, lake-like areas. Above the Highway 59 Bridge, recent high flows of 1997 have caused yet another levee break. The breach caused the river to flow to the north, spreading into an old mining area, becoming extremely shallow and possibly blocking salmon migration and spawning upstream. Emergency repairs increasing channel depth to allow fish passage are being completed and a long term solution is being developed.

Expected Benefits

This project is expected to increase the San Joaquin River system's annual salmon smolt contribution to the Delta. Using the criteria developed under the "4-Pumps" agreement to estimate benefits, the removal of 45 acres of predator habitat from the river channel by this project would produce an average of 19,794 salmon smolts annually at Mossdale. Potential spawning area restored by this project is 12,000 yd². Using the same criteria to estimate benefits, this portion of the gravel improvement would produce an average of 11,045 smolt equivalents annually to Mossdale. Additional benefits from improved river functions, sediment transport and increased riparian habitat would be expected.

The proposed project targets the San Joaquin River fall-run chinook salmon (USFWS species of concern) and is identified by CALFED as a priority species. The proposed project also targets CALFED priority habitat types; #3-Instream aquatic habitat and #4-Shaded riverine aquatic habitat.

The proposed project objects address the following primary Ecosystem Restoration Stressors:

- Identified Stressor #1 "Alteration of Flows and Other Effects on Water Management"-- The project proposes to reduce the effect of a migration barrier to downstream salmon smolt migration by reducing a potential predation risk/opportunity by warm water fish species and birds.
- Identified Stressor #3 "Channel Form Changes" -- Alterations of Channel Form have resulted in a lack of floodplain, degradation of instream habitat conditions, loss of lotic conditions, reduced suitability (unnatural) of in-channel corridor habitat for salmon and native wildlife species due to changes in hydraulic conditions, cover, and predation risk. Proposed stream channel manipulations are aimed at improving channel complexity, reducing substrate armoring, and increasing available gravel recruitment.

Secondary Ecosystem Stressors include:

- Identified Stressor #2 "Floodplain and Marshplan Changes" -- The project intends to reestablish a functional floodplain at the project site by filling the existing instream pond. The enhanced floodplain is intended to increase gravel recruitment, stimulate fine deposition on the floodplain rather than on the river bottom, increase available nutrients to the river system.

Background and Biological/Technical Justification

Historically, the Merced River supported spring and fall-run chinook salmon, and perhaps steelhead trout. Presently, the river only supports fall-run chinook salmon. As with other tributaries in the San Joaquin Basin, salmon escapements in the lower Merced River have varied significantly, from a high of 23,000 fish in 1985 to less than 100 fish in 1991. The 1995 escapement estimate was 2,541 salmon. This estimate includes fish returning to the Merced River Hatchery. San Joaquin Basin chinook salmon populations have declined to seriously low levels. Drought, inadequate stream flows, water storage and power development, habitat deterioration and Delta water exports have had varying degrees of impact. It is anticipated that San Joaquin tributary chinook salmon spawning populations will remain low unless more aggressive restoration and/or management action is taken.

The various effects of historic aggregate mining in the river channel are significant. These mining activities have left deep pits within the river corridor. Many of these pits were once protected by levees that were washed out during high river flows. The river now flows through these pits creating warm ponds of slow-moving water which are ideal habitat for large and smallmouth bass and other salmon smolt predators. The juvenile salmon migrating downstream become disoriented in the slow moving waters of the pond and become extremely vulnerable to predation by bass and other potential predators. Juvenile salmon transiting through these warm water ponds are less likely to survive than those salmon smolts outmigrating in faster moving cool river water. In addition, it is logical to assume that the ponds also serve as a reproduction site, rearing area, and distribution point from which these salmon predators migrate and recharge the river system.

In addition, flows on the Merced River have been reduced in magnitude, duration and frequency compared to historic natural flows. Lower flows have drastically changed the historic river geomorphology by substantially reducing gravel recruitment, perching floodplains, and allowing vegetation to encroach into the active channel. The perched floodplains, now farmed or grazed, no longer support large riparian tracts that shade the river, provide food habitat, woody debris for stream diversity, and nutrients to support a healthy aquatic environment. As a consequence, much of the salmon habitat has disappeared and the remainder is in very poor condition. Spawning, rearing, migratory and other aquatic and riparian habitats are all necessary components for a viable salmon population.

Eliminating these predator ponds will improve river flow characteristics, increase sediment transport, return floodplain and riparian shade, and help to diversify the total river ecosystem. Improving the river dynamics and diversifying the river characteristics will enrich the quantity and quality of salmon spawning and rearing habitat, improve both the adult and juvenile salmon migration pathway, and enhance salmon tributary survival by reducing contact of juvenile salmon smolts with predator fish and bird species.

Proposed Scope of Work

- Fall/Winter 1997 - Begin Environmental Documentation
 - Pre-project monitoring
 - Final engineering designs
- Summer 1998 - Begin Project Construction of Ratzlaff construction reach
 - Final Design of Lower Western Stone construction reach
- Fall/Winter 1998 - Begin post-project monitoring
- Summer 1999 - Finish Construction of Ratzlaff construction reach (if necessary)
 - Begin Project Construction of Lower Western Stone construction reach
 - Final Design of Western Stone construction reach
- Summer 2000 - Finish Construction of Lower Western Stone reach (if necessary)
 - Begin Project Construction of Western Stone construction reach

Monitoring and Evaluation

The monitoring and evaluation procedures are being developed for this and similar project in the San Joaquin River basin. Although no specific monitoring plan has been finalized, evaluation of the project would include the following.

- 1) Monitoring and evaluation of habitat types physical properties of the river channel, substrate and floodplain would be completed to determine pre-project, as-built project and post-project specifications. Cross sectional transects, pebble counts, bulk sampling, scour chains and general survey methodology would be used to determine change over time.
- 2) Monitoring and evaluation of biological properties including salmon populations, predator populations (fish and bird), spawning and rearing habitat, and salmon smolt survival would be completed to determine biological changes over time. DFG biologists have, and will continue to monitor adult salmon escapements in the Merced River.
- 3) Revegetation success is required by permitting agencies and would be completed by photo documentation and transect evaluation.

Implementability

The proposed project may begin construction in 1998. Preliminary engineering for the total project has been completed. Final construction plans for the Ratzlaff and lower Western Stone construction reaches are nearly completed. Final construction plans for the Western Stone construction reach are being developed.

Funding to construction the Ratzlaff reach of the project has been provided by the DWR "4-Pumps" program. Additional funds have been obtained from DFG Proposition 70 funds.

Local and environmental support for this project was acknowledged at the Bass Lake CALFED/SJRMPS San Joaquin River Fishery Technical Team meeting in January 1997 when the group agreed to include this project in the final report. The local landowners, county government and Merced River stakeholders are supportive of the project. The project would comply with all required Federal and State laws, regulations and environmental review.

IV. Cost and Schedule to Implement Proposed Project

Budget Costs

The total cost for this project is estimated at \$8,667,580. The following costs are related specifically to each construction reach of the project. The project would be completed over a 3-year period:

	Funds Needed	Currently Funded
Task 1. Ratzlaff Construction Reach 1998		
a. Construction (2 years if necessary)	\$2,200,000	\$2,200,200
b. Revegetation and habitat enhancement	\$150,000	\$150,000
c. Preliminary survey	\$20,000	\$20,000
d. Design and engineering	\$50,000	\$50,000
e. D.O.E. (Cost estimate, contract specs., bid)	\$70,000	\$70,000
f. Construction Management (2 YEARS)	\$100,000	\$100,000
g. Permits	\$5,000	\$5,000
h. Environmental documents	\$60,000	\$60,000
i. Maintenance	\$75,000	\$75,000
j. Evaluation and monitoring	\$50,000	\$50,000
k. Contingency (10% of construction)	\$220,000	\$220,000
*TOTAL	\$3,000,000	\$3,000,000
Task 2. Lower Western Stone Construction Reach 1999		
a. Construction (2 years if necessary)	\$2,097,800	\$0
b. Revegetation and habitat enhancement	\$150,000	\$0
c. Preliminary survey	\$20,000	\$20,000
d. Design and engineering	\$50,000	\$50,000
e. D.O.E. (Cost estimate, contract specs., bid)	\$70,000	\$0
f. Construction Management	\$100,000	\$0
g. Permits	\$5,000	\$0
h. Environmental documents	\$60,000	\$0
i. Maintenance	\$75,000	\$0
j. Evaluation and monitoring	\$50,000	\$0
k. Contingency (10% of construction)	\$209,780	\$0
*TOTAL	\$2,887,580	\$70,000

Task 3. Western Stone Construction Reach 2000

a. Construction (2 years if necessary)	\$2,000,000	\$0
b. Revegetation and habitat enhancement	\$150,000	\$0
c. Preliminary survey	\$20,000	\$20,000
d. Design and engineering	\$50,000	\$50,000
e. D.O.E. (Cost estimate, contract specs., bid)	\$70,000	\$0
f. Construction Management	\$100,000	\$0
g. Permits	\$5,000	\$0
h. Environmental documents	\$60,000	\$0
i. Maintenance	\$75,000	\$0
j. Evaluation and monitoring	\$50,000	\$0
k. Contingency (10% of construction)	\$200,000	\$0
*TOTAL	\$2,780,000	\$70,000

*All costs are preliminary estimates and are subject to change with final design.

The DWR's "4-Pumps" program has funded preliminary survey, design and construction of the Task 1, the Ratzlaff Reach, and construction is planned for 1998. Additional funding from DFG's Proposition 70 funds have been secured to supplement the project. All funds are presently being administered by DWR "4-Pumps" program. It is anticipated that the proposed project will be cost-shared among several other funding agencies. The proposed project has been identified as a priority restoration action in several State and Federal salmon restoration plans.

We are requesting \$1,000,000 to construction of the Lower Western Stone reach at this time. If granted, additional funding (\$1,000,000) may be requested at a later date. Administration of these funds would be placed under the administration of the DFG or DWR whichever would be most effective.

Scheduling Milestones and Incremental Funding

The following is a tentative work schedule for this project.

Fall/Winter 1997 - Begin Environmental Documentation

- Pre-project monitoring
- Final engineering designs

Summer 1998 - Begin Project Construction of Ratzlaff construction reach

- Final Design of Lower Western Stone construction reach

Fall/Winter 1998 - Begin post-project monitoring

Summer 1999 - Finish Construction of Ratzlaff construction reach (if necessary)

- Begin Project Construction of Lower Western Stone construction reach
- Final Design of Western Stone construction reach

- Summer 2000 - Finish Construction of Lower Western Stone reach (if necessary)
 - Begin Project Construction of Western Stone construction reach

No incremental fund for this project is necessary. Funds granted would be placed into either DFG or DWR accounts and utilized to implement the construction of this project.

Third Party Impacts

No third party impacts are expected. cursory discussions with Merced County, landowners and Merced River Stakeholders suggest no problems.

V. Applicants Qualifications

DFG's Region 4 anadromous fishery staff administered \$1.5 million dollars in the 1995-96 fiscal year. In 1995-96 they helped develop 21 habitat restoration projects and completed the environmental documentation for 5 of these projects. They have been named contract managers for several restoration, revegetation, fish screening and fish research projects. Region 4 staff has work closely with the various other state, federal and private personnel, to construct chinook salmon spawning, rearing and predator pond isolation project in the San Joaquin River basin.

DWR engineering staff and "4-Pumps" personnel have constructed several restoration projects in the San Joaquin River Basin. They have worked closely with DFG personnel on many projects and have constructed the following projects.

Merced River Riffle Reconstruction Project 1991: A riffle reconstruction project.

M. J. Ruddy Project 1992: A mile river restoration project. Site revegetation was also completed.

Tuolumne River Riffle Reconstruction Project 1993: A riffle reconstruction project. Site revegetation was also completed.

Stanislaus River Riffle Reconstruction Project 1995: A riffle reconstruction project. Site revegetation was also completed.

Magneson Pond Predator Isolation Project 1996: A pond isolation project. Site revegetation was also completed.

Reed Pond Predator Isolation Project 1997: A pond isolation and floodplain reconstruction project. Site revegetation is also included.

The DFG/DWR staff assigned to implement this project are:

Mr. Bill Loudermilk, DFG Senior Fisheries Biologist (M/F)
Mr. Clarence J. Mayott, DFG Associate Fisheries Biologist (M/F).
Mr. Kevin Faulkenberry, DWR Associate Engineer.

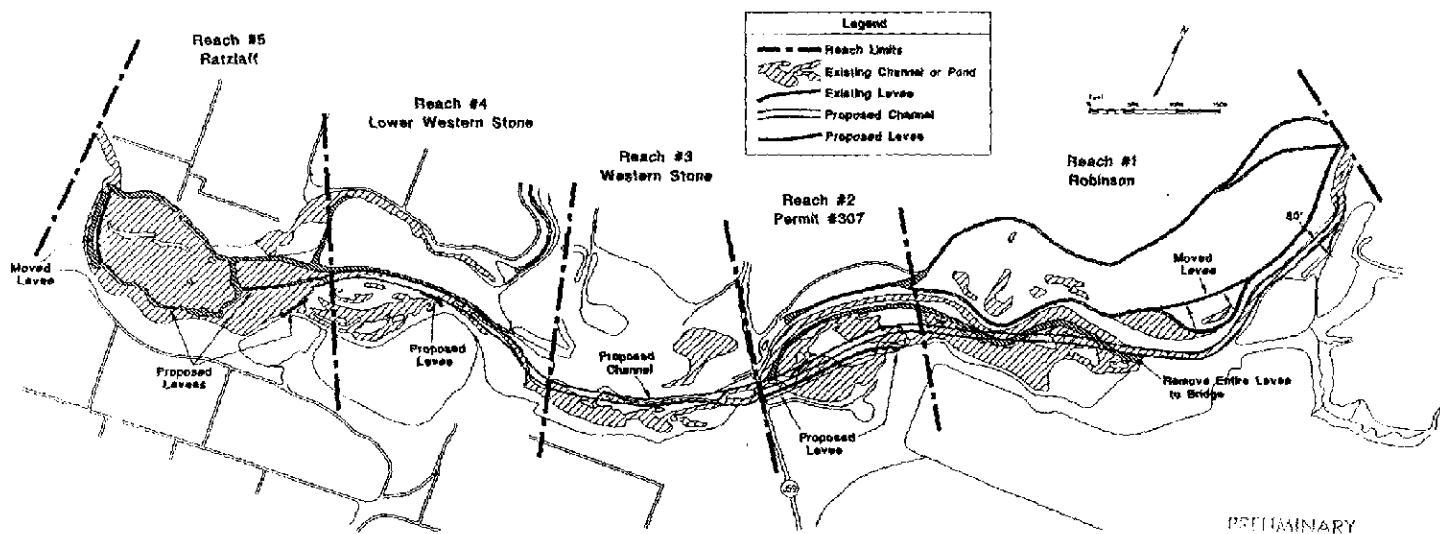
Mr. Fred Jurick, DFG Associate Fisheries Biologist (M/F).
Ms. Stephanie Spaar, DWR Senior Environmental Specialist

This core staff will obtain administrative support both DFG and DWR's clerical, fiscal and contractual personnel. DFG and DWR's environmental and wildlife personnel will provide technical and scientific review when necessary.

VI. Compliance with Standard Terms

DFG and DWR are public agencies and will comply with appropriate terms and conditions pursuant to policy, regulation and law.

Attachment 1



MERCED RIVER - Miles 40.0 to 43.5
Plan View

STATE OF CALIFORNIA
The Resources Agency
DEPARTMENT OF WATER RESOURCES
SAN JOAQUIN DISTRICT

Approved by
James Cooper

Designed by
K. Touloukianberry
Drawn by
K. Wenden

Checked by
Eugene
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